SIEMENS

MAMMOMAT 300/3000

TD

Replacement of Cable-Hose

Repair Instructions

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English
Print No.: RX B7-120.091.03.02.02
Doc. Gen. Date: 04.98
Replaces: RX B7-120.091.03.01.02
64 60 492

Chapter	Revision
All	02

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Products affected

All Mammomat 3000 and Mammomat 3000 Modular.

NOTE!

Steps only applicable for Mammomat 3000 with serial No. from 03000 and upwards will be marked with: **Only for Mammomat 3000 with serial No. from 03000 and upwards**.

Documents required

- Wiring Diagram MAMMOMAT 3000
- Installation and Start-Up Instructions MAMMOMAT 3000

Tools and equipment required

- Standard assembly tools
- Screw clamp
- Protective ground wire tester (art. no. 44 15 899 RVO90)
- Pulling wire
- Insulating tape
- AMP-pin extractor

Parts required

A replacement of the cable-hose on a MAMMOMAT 3000 with serial No. lower than 03000 requires installation kit, part No. 63 69 941.

A replacement of the cable-hose on a MAMMOMAT 3000 with serial No. 03000 or higher requires installation kit part No. 64 38 571.

Both installation kits comprise the following parts:

Qty	Part
1	Cable-hose
26	Cable ties (long)
6	Cable ties (short)
1	Isolation tube (70 mm and 77 mm respectively)
1	Silicon oil (incl. packing)
2	Hose clamp
1	Repair Instructions

NOTE!

If the MAMMOMAT is not equipped with a cable-hose support bracket, such a component shall be installed (according to UI 41/95).

Time required

1 technician / approx. 8 hours.

Safety notes

Protective measures

It is essential to comply with section *Protective measures* in *Installation and StartUp Instructions MAMMOMAT 3000.*

Tests, where radiation is used, are marked with the X-ray warning symbol, see *Figure 1*.

Figure 1 X-ray warning symbol

Mains supply off

Prior to intervention in the equipment, disconnect it from the power supply with the mains switch.

Safety

WARNING!

When the covers are reinstalled, all contact segments must be fitted in their original positions and the screws must be secured. By doing this, the ground connection over the contact segments is secured and possible noise signals are avoided.

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Removal of stand covers

The Mammomat 3000 stand covers exist in two versions:

- one with separate rear side covers
- one with a single rear cover that also covers the rear sides

Mammomat stand with separate rear side covers

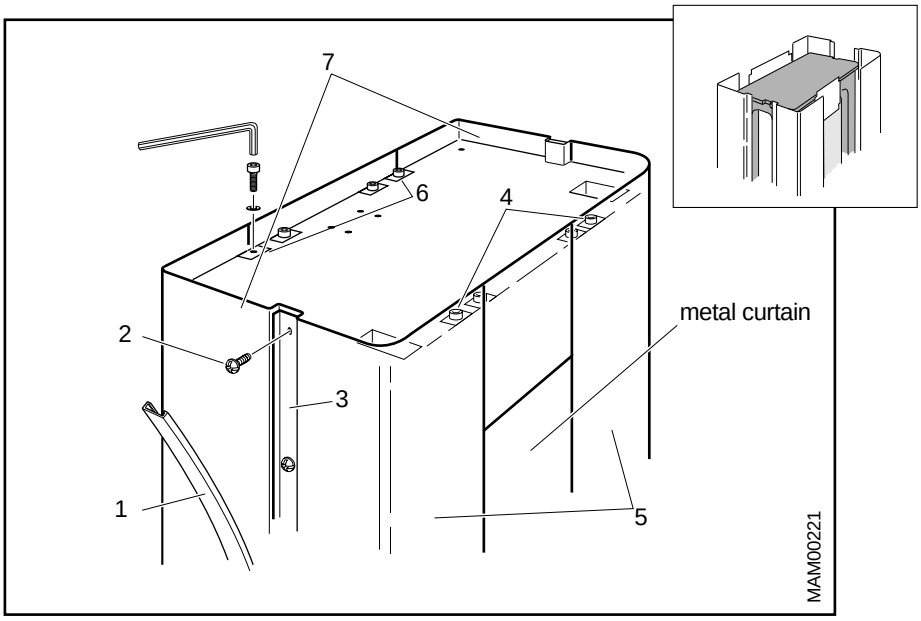

Figure 1 Mammomat with separate rear side covers

WARNING!

The metal curtain (see Figure 1) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

Elevate swivel-arm system to a comfortable working height.
System OFF.

- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (4) and front covers (5).
- Remove screws (6) and rear side covers (7).

Mammomat with single rear cover

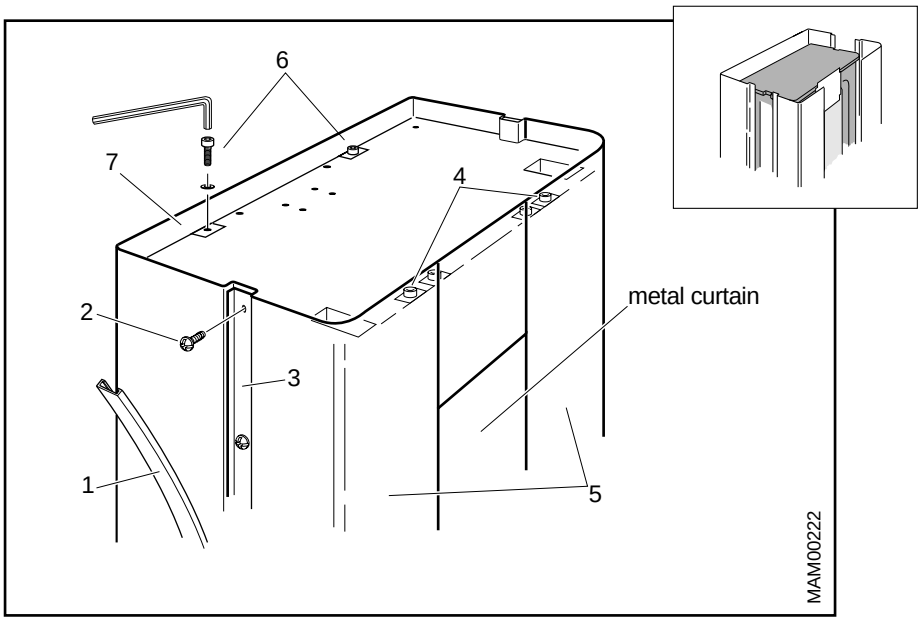

Figure 2 Mammomat with single rear cover

WARNING!

The metal curtain (see Figure 2) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

Elevate swivel-arm system to a comfortable working height.
System OFF.

- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (6) and rear cover (7).
- Remove screws (4) and front covers (5).

Removal of swivel arm covers

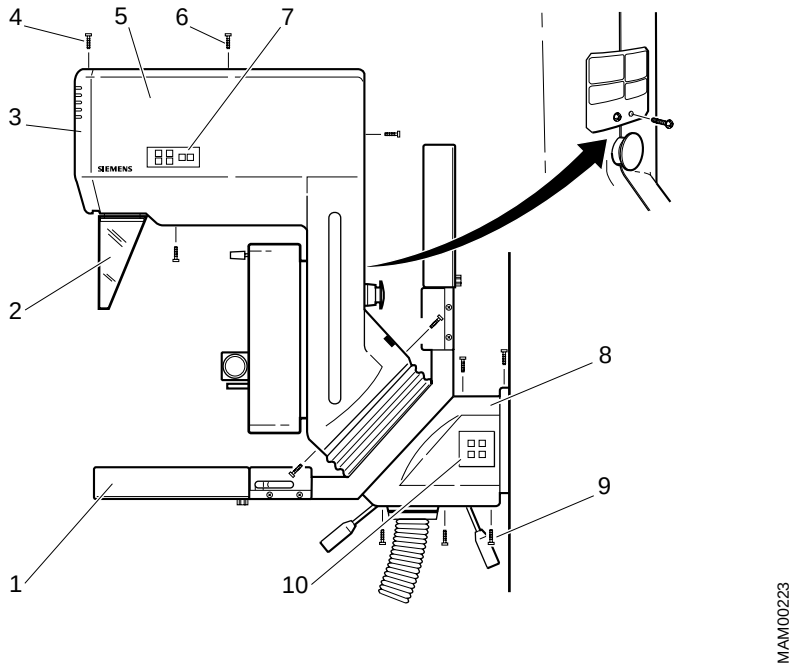

Figure 3 Removal of swivel arm covers

- Remove object table (1).
- Remove face shield (2) by sliding it off its holder.
- Remove front cover (3) by removing two screws (4).
- Remove side covers (5) by removing twelve screws (6) and disconnecting the two connectors X807, connected to tube head controlpanel (7), and the two ground cables.
- Remove the shaft covers (8) by removing ten screws (9) and disconnecting the two connectors X808, connected to control panel (10) inside the shaft cover.

CAUTION!

When removing the side and shaft covers, be careful not to damage the X807 and the X808 connectors respectively.

Removal of compression unit

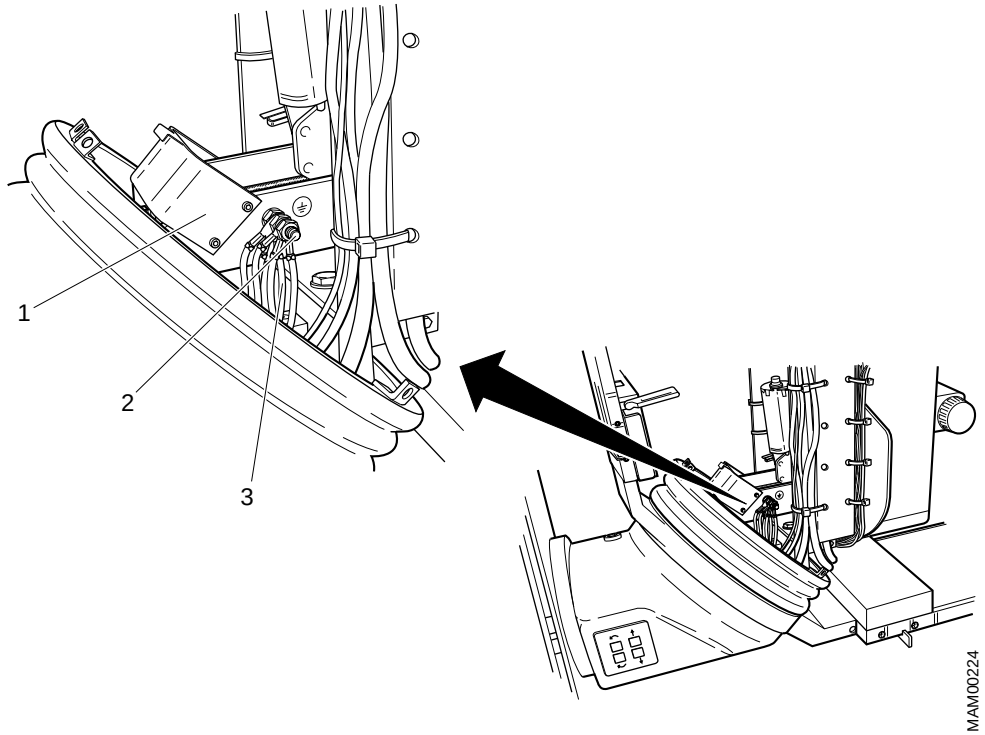

Figure 4 Location of ground cables and cable guide

- Remove cable guide (1).
- Remove earth screw (2) and ground cables (3).

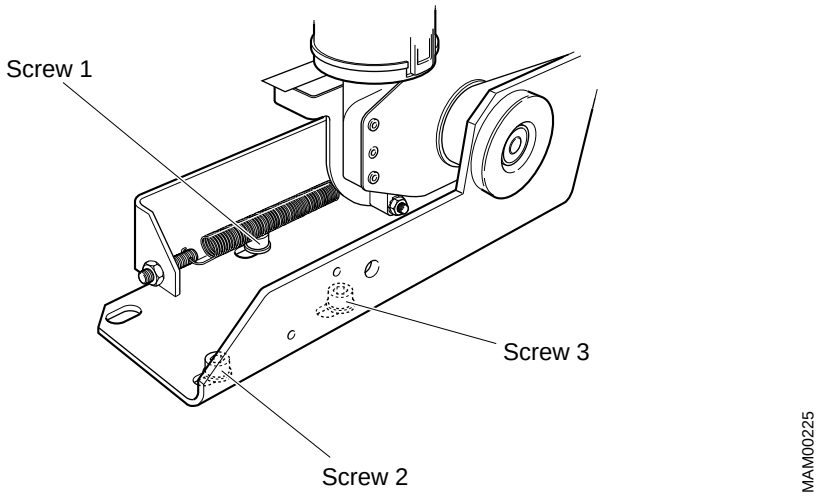

Figure 5 Removal of compression unit

NOTE!

Before removing the compression unit it is essential to mark up the position of the base beam of the compression unit. This is to ensure proper alignment when remounting the compression unit.

1 Loosen and remove screws and washers 1 and 2 that hold the compression unit base beam (see *Figure 5*).

2 Loosen screw 3 by half to tilt the compression unit slightly forward.

3 Pull connector X872 out of printed circuit board D805.

4 Pull out connectors X873a and X874, which are located behind the compression unit.

5 Loosen and remove screw 3, and remove the compression unit.

Further removals

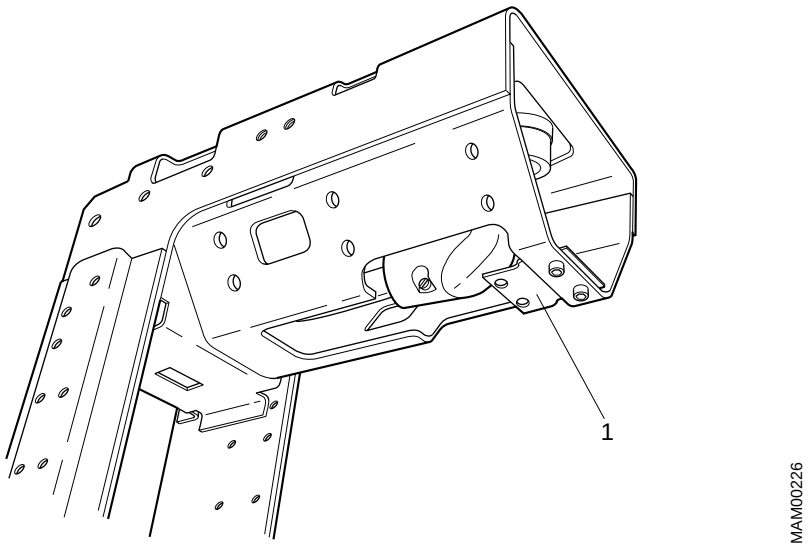

Figure 6 Anchor plate location

1 Remove the fan unit by removing the screws that hold the fan unit mounting bracket.

2 Remove anchor plate (1).

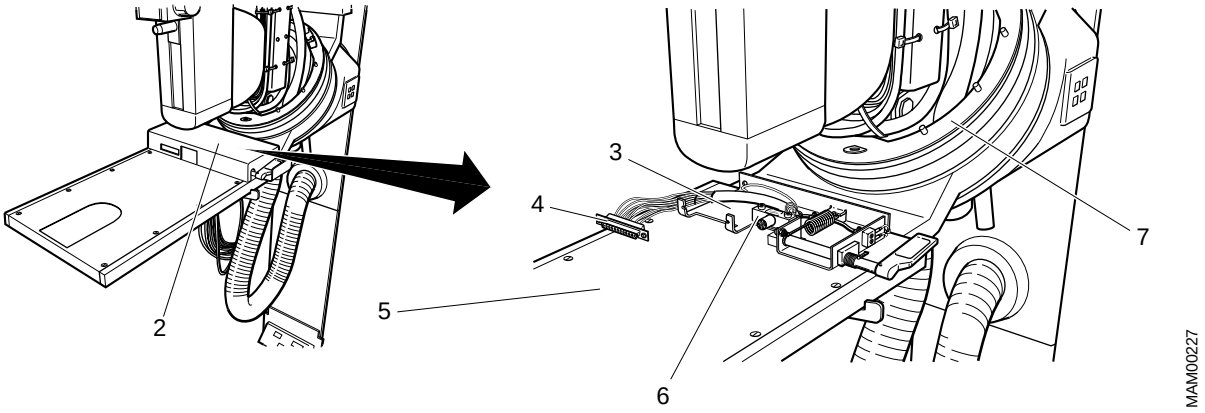

Figure 7 Components on object table

3 Remove cover (2) by removing two screws on the back.

4 Remove the screws holding the connector X893 (4). Mark the top of the connector.

5 Remove the screws holding the connector X891 (6). Mark the top of the connector.

6 Remove the screws holding the assembly plate (3).

7 Remove the screws holding the cover plate (5).

8 Loosen bellow (7) by removing plastic guide blocks inside the bellow.

Cable release

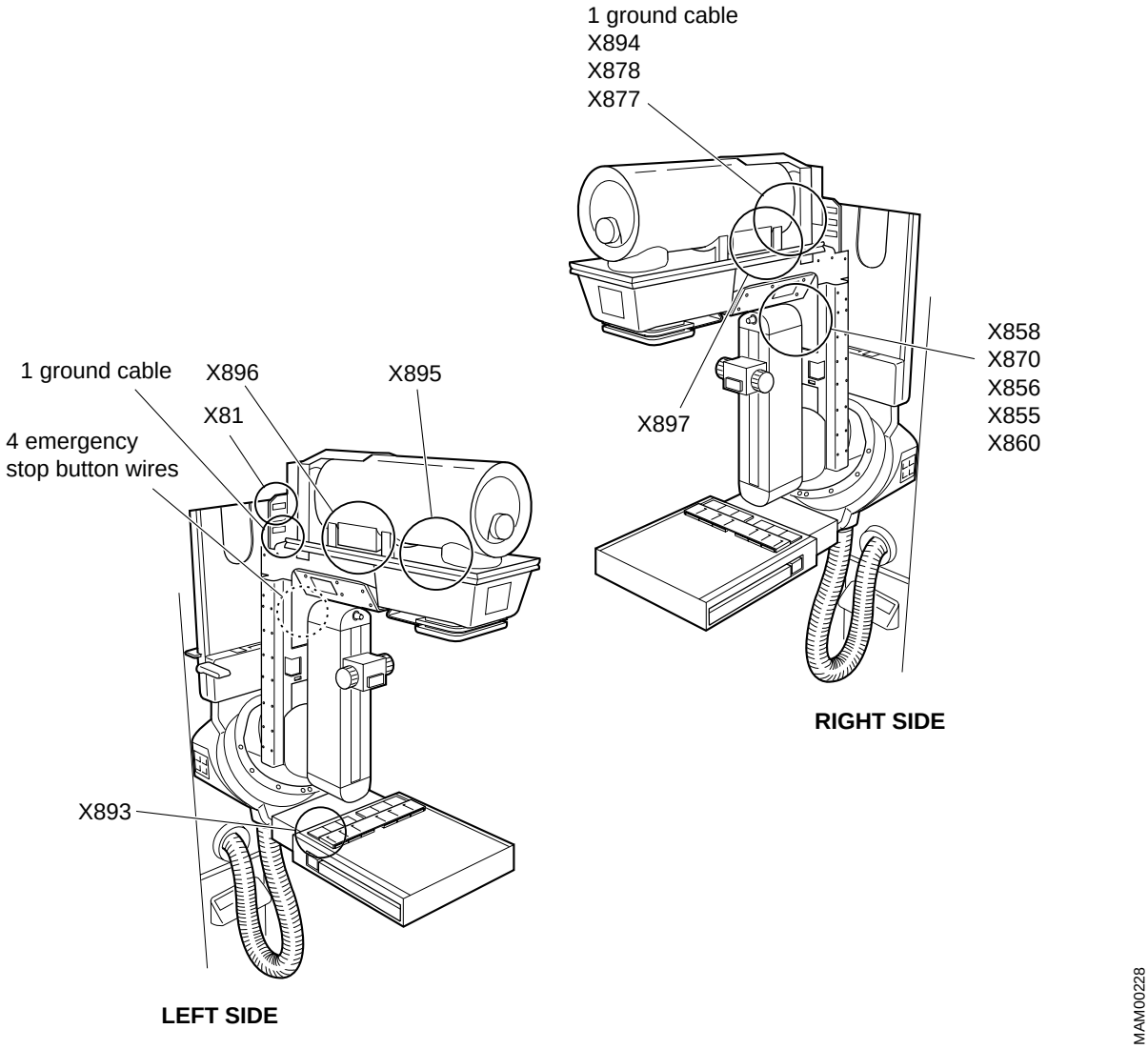

Figure 1 Cables to be released

1 Disconnect all cables according to *Figure 1* in the order listed in the table on next page (including ground cable). Connectors which are marked in grey in the table below have already been disconnected.

Cable No.	Approximate location
X895	Front of X-ray tube.
X896	7 connectors. 6 on X-ray tube base (left side). 1 ground connection on collimator frame.
X894	Below fan unit.
X878	Below fan unit.
X877	Below fan unit.
X897	4 connectors. 3 on X-ray tube base (right side), 1 ground connection on collimator frame.
X858	In front of circuit board D805 (covered by isolation tube).
X870	In front of circuit board D805 (covered by isolation tube).
X856	On circuit board D805.
X855	On circuit board D805.
X860	On circuit board D805.
4 emergency stop button cables	On emergency stop button.
2 ground cables	1 at rear end of X-ray tube, 1 in stand frame.
X81	On cirquit board D810.
X893	Biopsy D-Sub on object table.
X872	On circuit board D805
X873a	Between circuit board D805 and compression unit.
X874	Between circuit board D805 and compression unit.
5 ground cables	Swivel arm base beam.
2 fan cables	Below fan unit.

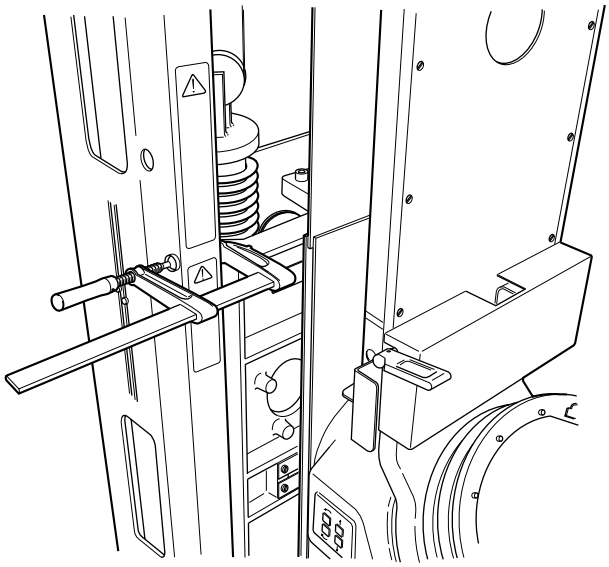

Figure 2 Lifting carriage vertically locked with screw clamp

CAUTION!

To prevent the lifting carriage to move vertically it is important to lock it in its position by means of a screw clamp, (see step 2 below).

2 Fasten a screw clamp to the stand just above the lifting carriage, before loosening the X-ray tube. This will prevent the lifting carriage from moving upwards (see *Figure 2*)

.

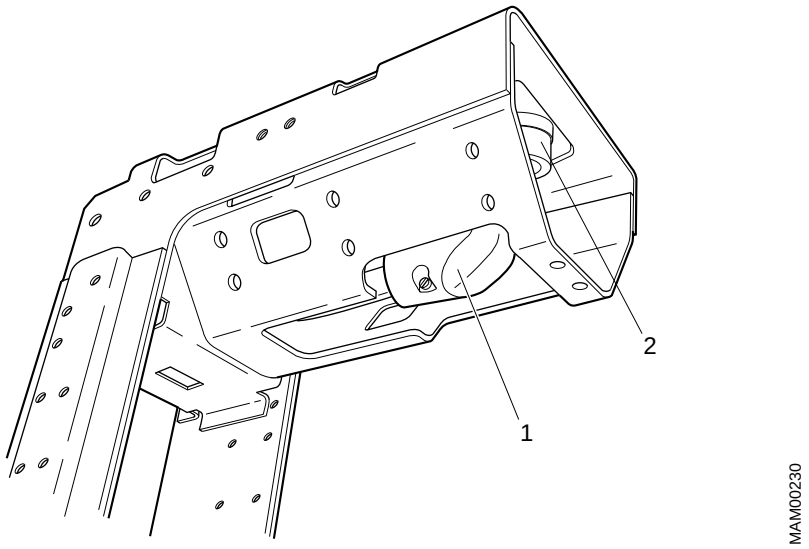

Figure 3 Location of high voltage cable

CAUTION!

The lifting carriage is well balanced. If the X-ray tube is removed and the carriage is not locked, the carriage will move upwards.

3 Remove the four fixing screws of the X-ray tube. Lift the X-ray tube to access the sleeve nut (2) of the high-voltage connector. Disconnect the high-voltage cable (1) by unscrewing the sleeve nut (2). (The high-voltage connector may not look exactly as shown in *Figure 3*.)

4 Mark the position of each cable, where it is strapped to the stand and also the strapping point.

5 Remove the angular cable-sleeve halves from the high-voltage connector. Also remove the metal rings inside the connector. (This step is not applicable for high-voltage cables without the angular cable-sleeve.)

6 Cut the cable ties which hold the cables to be released.

7 Release all disconnected cables from the swivel arm.

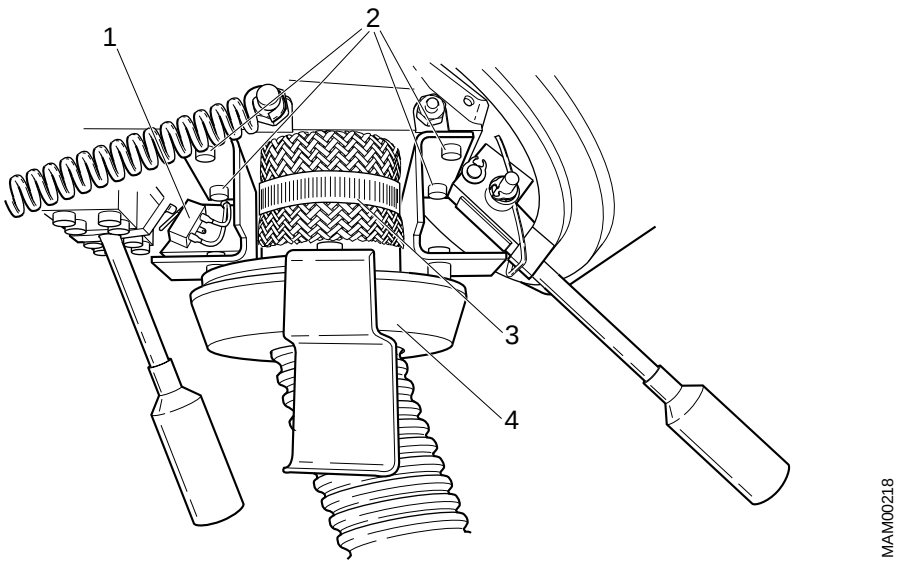

Figure 4 Dismounting the lead-through ring

8 Remove stereo lever switch (1).

9 Remove lead-through ring (4) by loosening the four screws (2).

10 Loosen hose clamp (3).

Only for Mammomat 3000 with serial No. from 03000 an upwards:

11 Unfold the shielding and remove the semicircular cabel clamp.

12 Secure the shielding to the cables with insulating tape.

Further removals

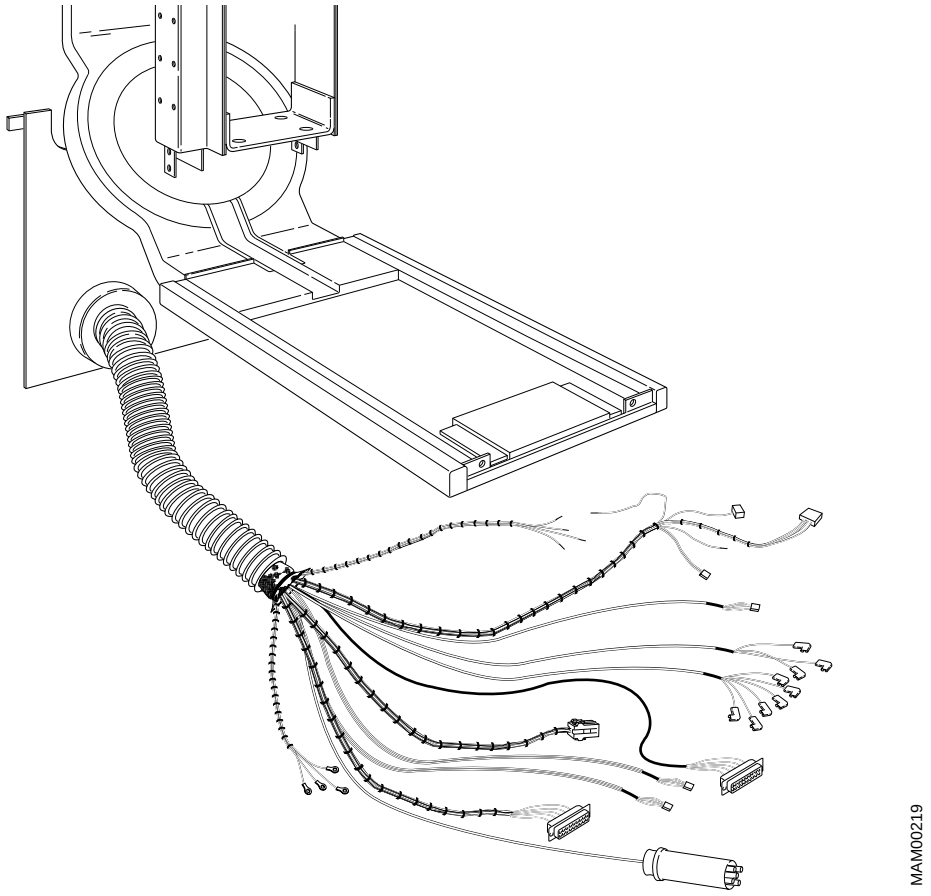

Figure 5 Cable hose completely released from swivel arm system

13 Pull the cable-hose with belonging cable harness out of the lead-through ring (see *Figure 5*).

NOTE!

Prior to step 14; note the connector location of each and every wire within X860. It is of extreme importance that they are properly reconnected.

14 Extract the X860-pins from their connector.

15 Wind the harness with insulating tape, for an easy removal of the hose. Attach a cord at the end of the harness. The harness can be pulled through the hose with this cord.

CAUTION!

The labels on the cables and the connectors are not allowed to get in contact with the sticky side of the insulating tape. Otherwise the labels could be damaged or even removed, when the insulating tape is removed.

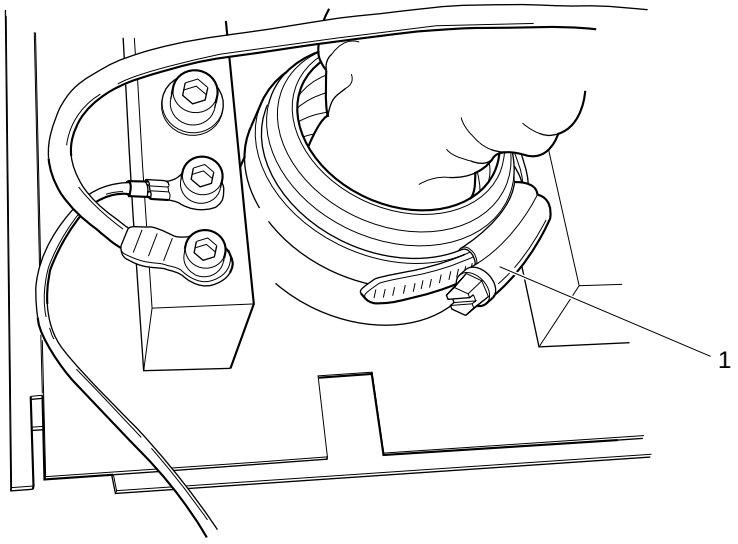

Figure 6 Hose clamp on the back

16 Loosen hose clamp (1) on the back of the lifting carriage.

17 Remove cable-hose from cable harness. Then mount new hose.

18 Secure the hose on the back of lifting carriage with the hose clamp.

Only for Mammomat 3000 with serial No. from 03000 an upwards:

- Make sure that the shielding is folded over the lead-through ring and that the semi-circular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.

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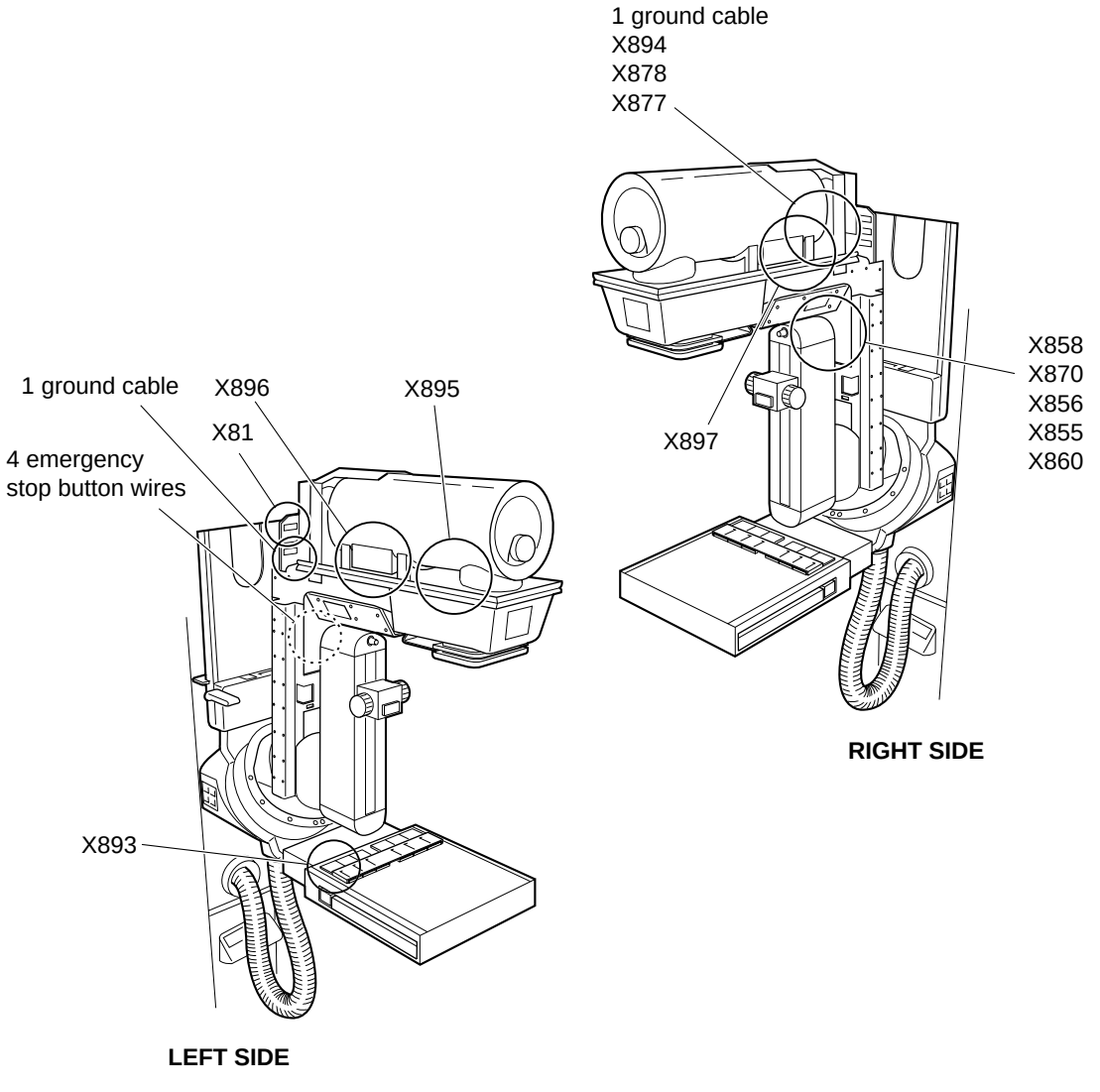

Figure 1 Connectors to be reconnected

1 Place lead-through ring and hose clamp on the new hose.

2 Pull new cable-hose with belonging cable harness through hollow shaft.

3 Make sure that the cables (connectors) reach their original positions when they are pulled as intended.

4 Install lead-through ring.

5 Install stereo switch.

6 Split main harness into two subharnesses (see *Figure 3*).

One subharness consists of cables to be pulled on the left side of the swivel-arm stand. The other consists of cables to be pulled on the right side of the swivel-arm stand.

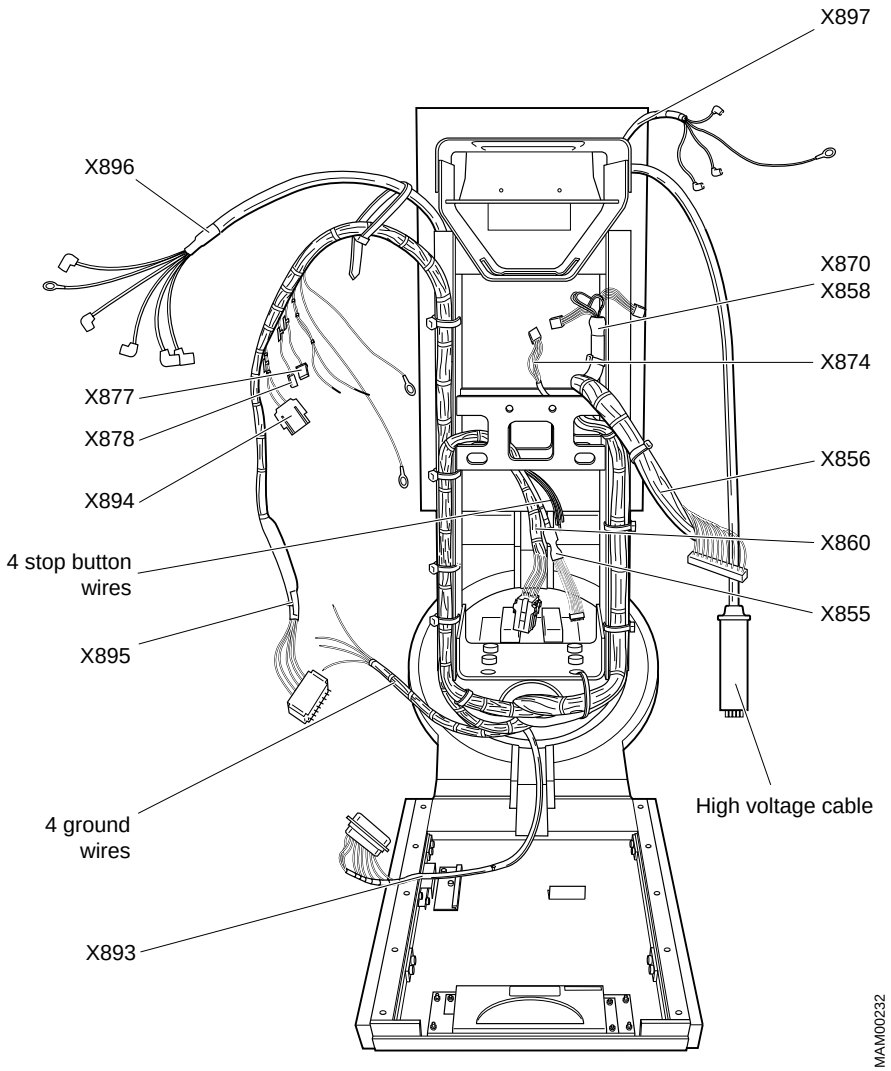

Figure 2 Subharnesses left and right

7 Adjust hose to centre the main harness in hose.

8 Secure hose clamp.

Only for Mammomat 3000 with serial No. from 03000 an upwards:

- Make sure that the shielding is folded over the lead-through ring and that the semi-circular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.

9 Pull all cables as intended (according to *Figure 2* and *Figure 3*) and reconnect all connectors except the ones for the compression unit. When reconnecting high voltage cable; apply some silicon oil on the contact surface of connector. Reconnect emergency stop button cables according to *Figure 5* and the list below. X891 and X893 shall be mounted according to *Figure 4*

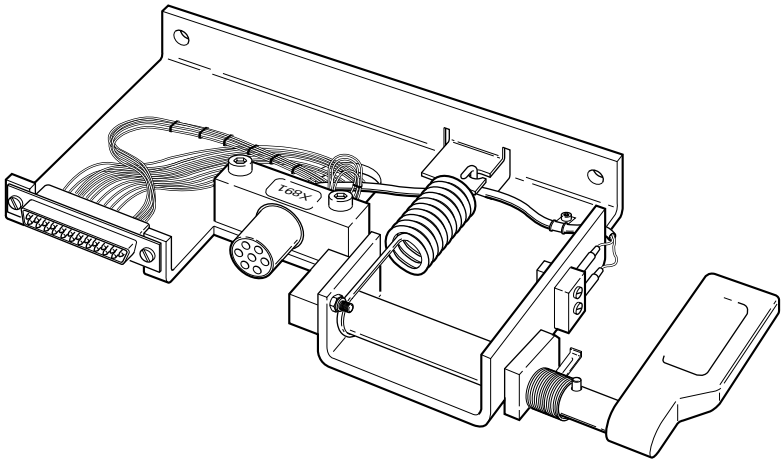

Figure 3 Reassembly of X891 and X893

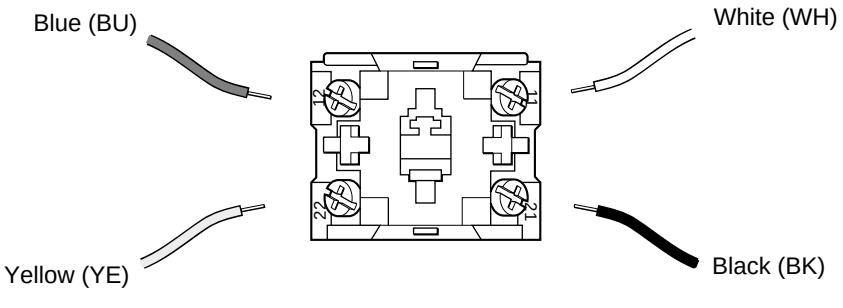

Figure 4 Reconnection of emergency stop button wires

10 Secure reconnected cables with cable ties. In flying wing: attach cable ties with screws to frame (see *Figure 6).*

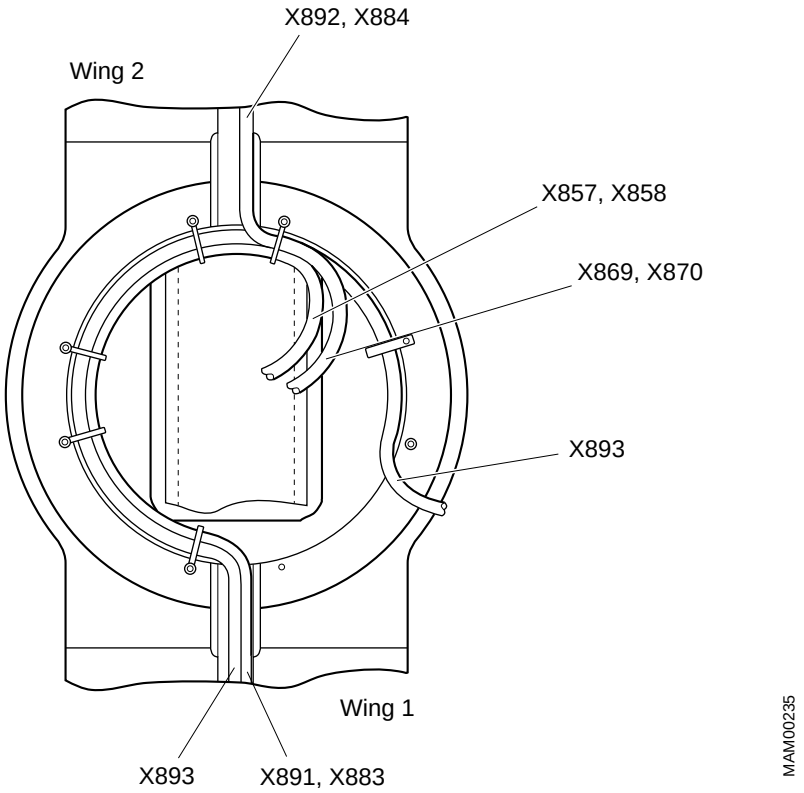

Figure 5 Reassembly of flying wing base cables

11 Mount fan unit.

12 Place compression unit and fasten screw number 3 (see *Figure 4, Section 2*) by half to tilt the compression unit slightly forward.

13 Reconnect the X872, X873a and X874.

CAUTION!

Make sure that X874 does not interfere with the mounting bracket for the forkshaped sensor.

14 Mount bellows.

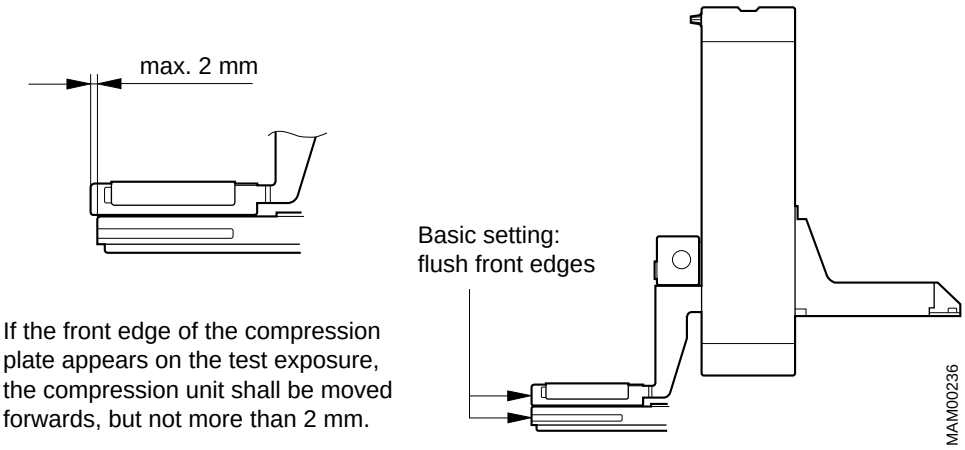
max. 2 mm
If the front edge of the compression plate appears on the test exposure, the compression unit shall be moved forwards, but not more than 2 mm.
Basic setting:
flush front edges
MAM00236

Figure 6 Correct position of compression unit

15 Fasten compression unit by securing the three mounting screws while observing the correct position as marked during disassembly.

16 Connect ground cables and mount cable guide. Remove the protective strips from the metal curtain.

17 System ON.

18 Test the stereoswitch.

19 Attach a compression plate to the compression unit. Test all movements of the unit (compression, flying wing, tube head rotation, lifting carriage). Make sure that no cables interfere with the movements.

20 Perform a test exposure and check the radiation field.
If the front edge of the compression plate appears on the exposure, correct the position according to *Figure 6*.

21 System OFF.

22 Mount all covers.

23 Perform protective earth measurement.

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Products affected

All Mammomat 300.

NOTE!

Steps only applicable for Mammomat 300 with serial No. from 04000 and upwards will be marked with: **Only for Mammomat 300 with serial No. from 04000 and upwards**.

Documents required

- Wiring Diagram MAMMOMAT 300
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Tools and equipment required

- Standard assembly tools
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- Pulling wire
- Insulating tape
- AMP-pin extractor

Parts required

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Both installation kits comprise the following parts:

Qty	Part
1	Cable-hose
26	Cable ties (long)
6	Cable ties (short)
1	Isolation tube (70 mm and 77 mm respectively)
1	Silicon oil (incl. packing)
2	Hose clamp
1	Repair Instructions

NOTE!

If the MAMMOMAT is not equipped with a cable-hose support bracket, such a component shall be installed (according to UI 41/95).

Time required

1 technician / approx. 8 hours.

Safety notes

Protective measures

It is essential to comply with section *Protective measures* in *Installation and Start-Up Instructions MAMMOMAT 300.*

Tests, where radiation is used, are marked with the X-ray warning symbol, see *Figure 1*.

Figure 1 X-ray warning symbol

Mains supply off

Prior to intervention in the equipment, disconnect it from the power supply with the mains switch.

Safety

WARNING!

When the covers are reinstalled, all contact segments must be fitted in their original positions and the screws must be secured. By doing this, the ground connection over the contact segments is secured and possible noise signals are avoided.

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Removal of stand covers

The Mammomat 300 stand covers exist in two versions:

- one with separate rear side covers
- one with a single rear cover that also covers the rear sides

Mammomat stand with separate rear side covers

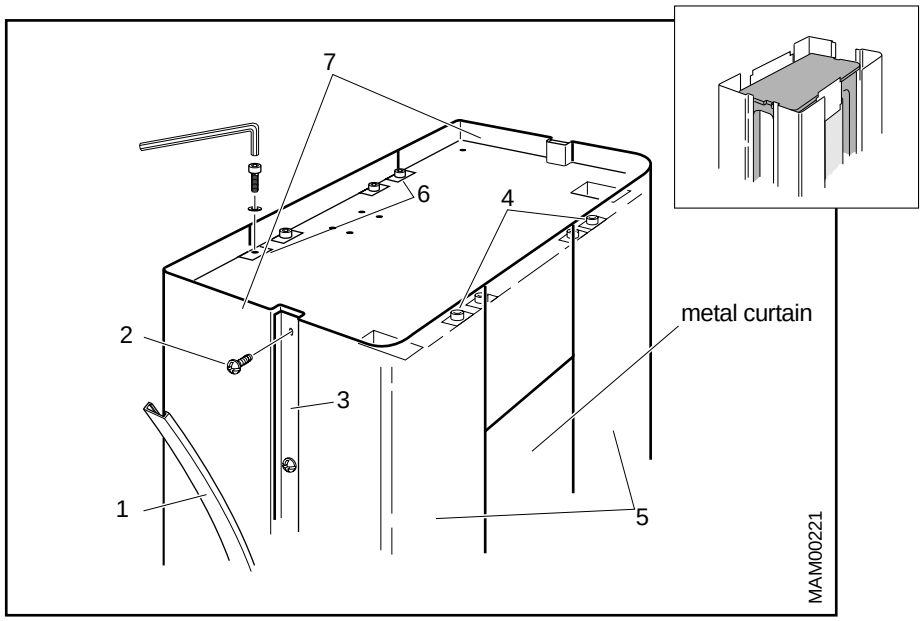

Figure 1 Mammomat with separate rear side covers

WARNING!

The metal curtain (see Figure 1) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

Elevate swivel-arm system to a comfortable working height.
System OFF.

- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (4) and front covers (5).
- Remove screws (6) and rear side covers (7).

Mammomat with single rear cover

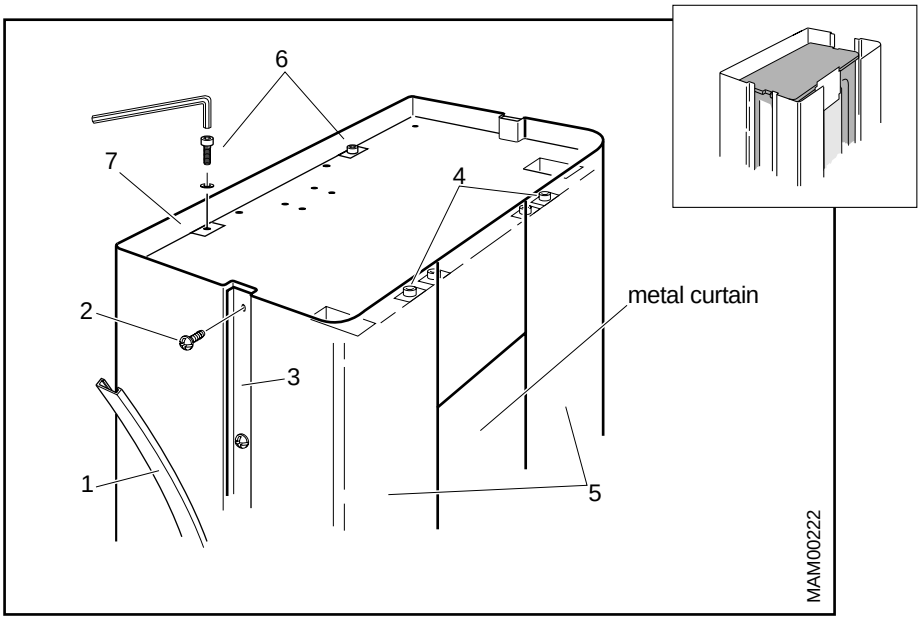

Figure 2 Mammomat with single rear cover

WARNING!

The metal curtain (see figure 2) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

Elevate swivel-arm system to a comfortable working height.
System OFF.

- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (6) and rear cover (7).
- Remove screws (4) and front covers (5).

Removal of swivel arm covers

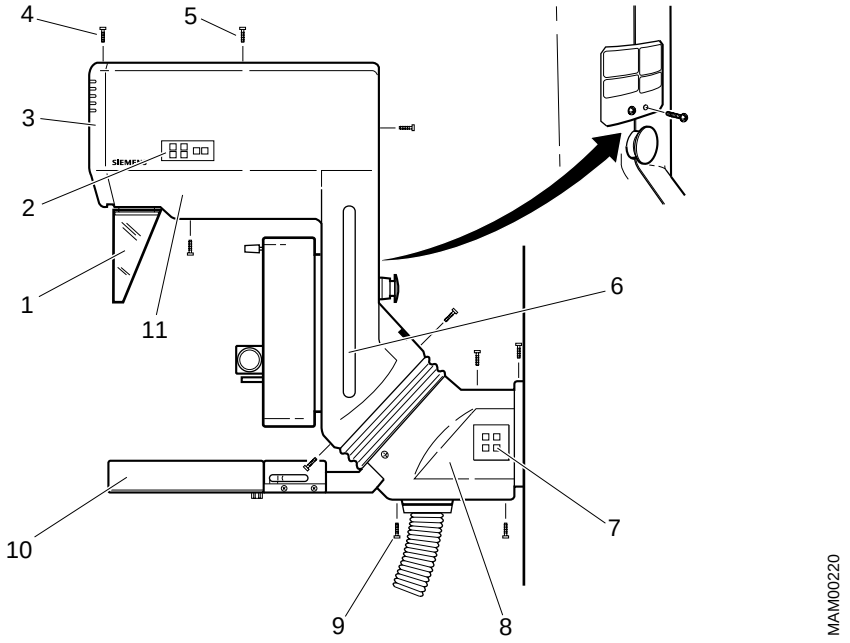

Figure 3 Removal of swivel arm covers

- Remove face shield (1) by sliding it off its holder.
- Remove object table (10).
- Remove front cover (3) by removing two screws (4).
- Remove side covers (11) by removing twelve screws (5) and disconnecting the two connectors X807, connected to tube head control panel (2), and loosen the two ground cables.
- Remove two shaft covers (8) by removing ten screws (9) (two screws holds a tinplate and does not need to be removed) and disconnecting the two connectors X808, connected to supporting arm control panel (7) inside the shaft cover.

CAUTION!

When removing the side and shaft covers, make sure that the X807 and the X808 connectors respectively are not damaged.

Removal of compression unit

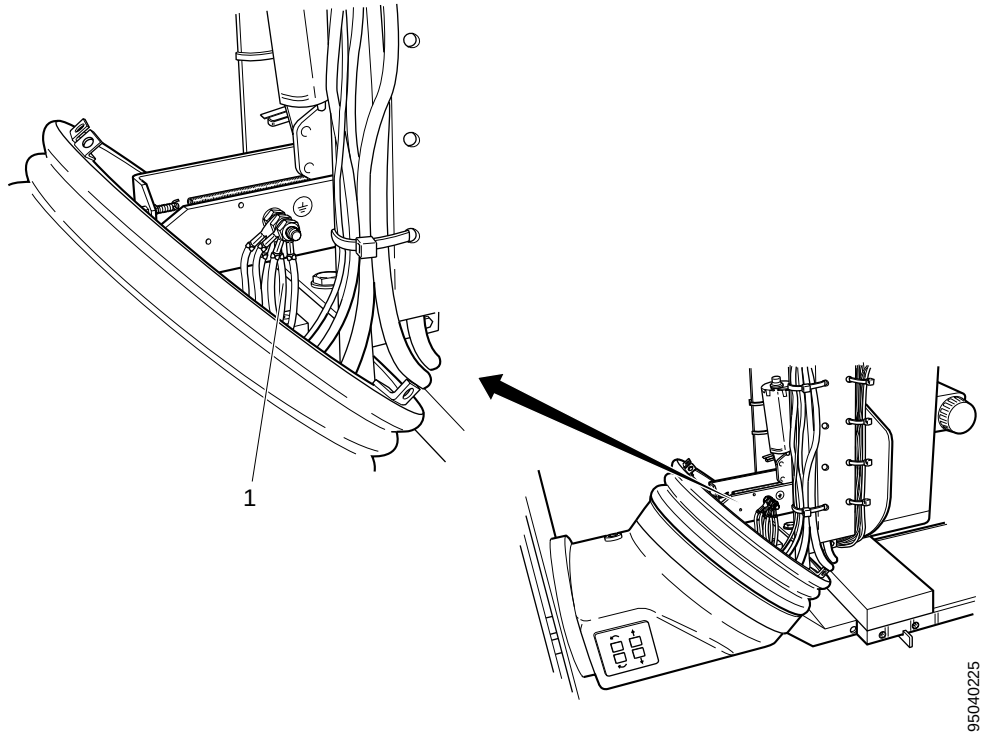

Figure 4 Location of ground cable and protection plate

- Remove ground cables (1).

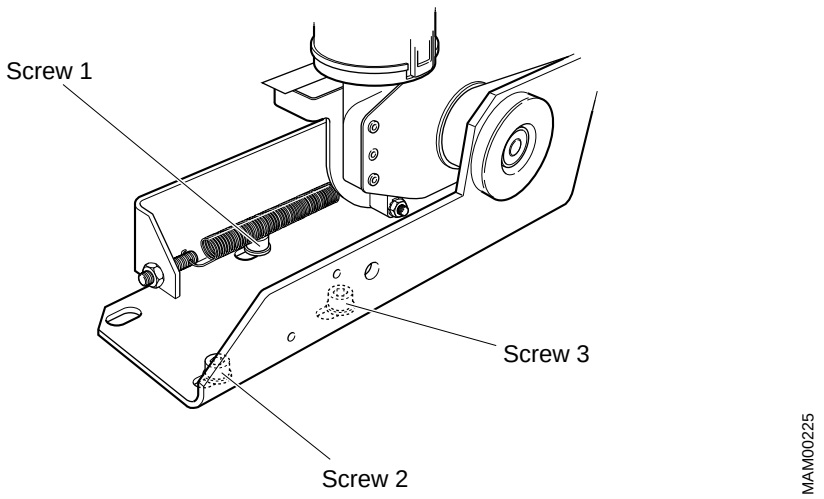

Figure 5 Removal of compression unit

NOTE!

Before removing the compression unit it is essential to mark up the position of the base beam of the compression unit. This is to ensure proper alignment when remounting the compression unit.

1 Loosen and remove screws (and washers) 1 and 2 that hold the compression unit base beam (see *Figure 5*).

2 Loosen screw 3 by half to tilt the compression unit slightly forward.

3 Pull connector X872 out of printed circuit board D805.

4 Pull out connector X873a and X874, which are located behind the compression unit.

5 Loosen and remove screw 3 and remove compression unit.

Further removals

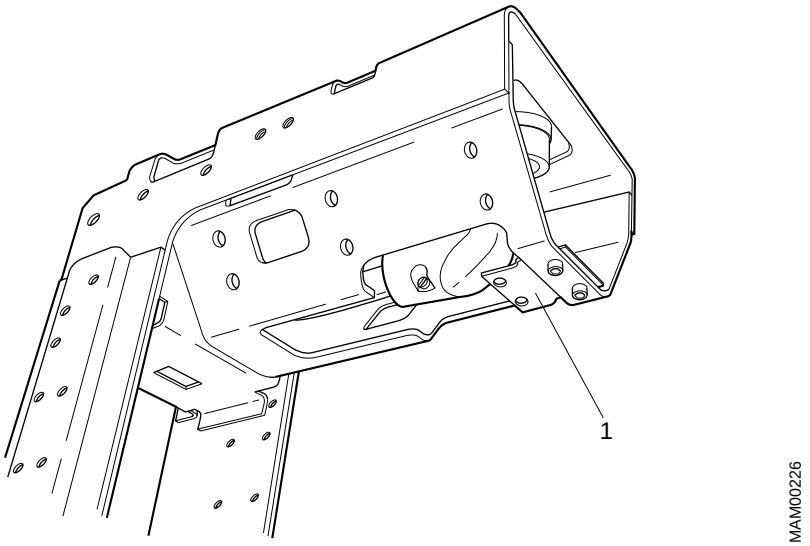

Figure 6 Anchor plate location

1 Remove fan unit by removing the screws that hold the fan unit mounting bracket.

2 Remove anchor plate (1).

Cable release

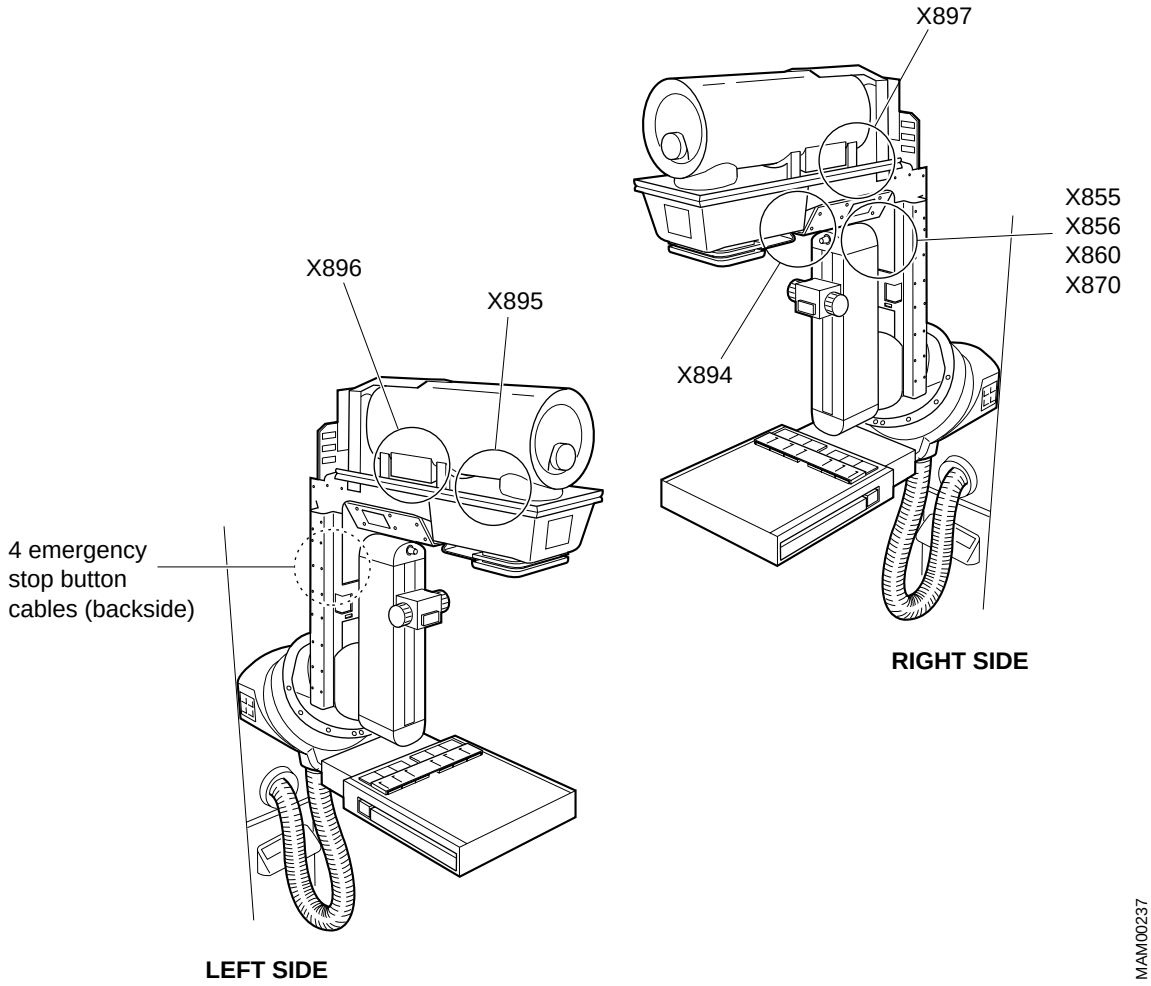

Figure 1 Connectors to be released

1 Remove all cables according to *Figure 1* in the order listed below (including ground cable). Connectors which are marked in grey in the table have already been disconnected.

Cable No.	Approximate location
X895	Front of X-ray tube.
X896	5 connectors. 4 on X-ray tube base (left side). 1 ground connection on collimator frame.
X894	Behind diaphragm.
X897	4 connectors. 3 on X-ray tube base (right side), 1 ground connection on collimator frame.
X870	On circuit board D805 (covered by isolation tube).
X856	On circuit board D805.
X855	On circuit board D805.
X860	On circuit board D805.
4 emergency stop button cables	On emergency stop button.
2 ground cables	1 in rear end of ray unit. 1 in frame.
X872	On circuit board D805.
X873a	Between circuit board D805 and compression unit.
X874	Between circuit board D805 and compression unit.
6 ground cables	Swivel arm base beam.
2 fan cables	Below fan unit.

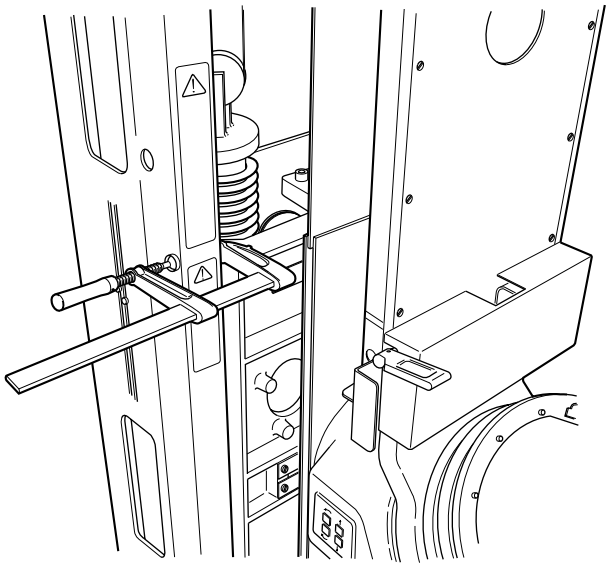

Figure 2 Lifting carriage vertically locked with screw clamp

CAUTION!

To prevent the lifting carriage to move vertically it is important to lock it in its position by means of a screw clamp, (see step 2 below).

2 Fasten a clamp to the stand, before loosening the X-ray tube. This will prevent the lifting carriage from moving upwards (see *Figure 2*).

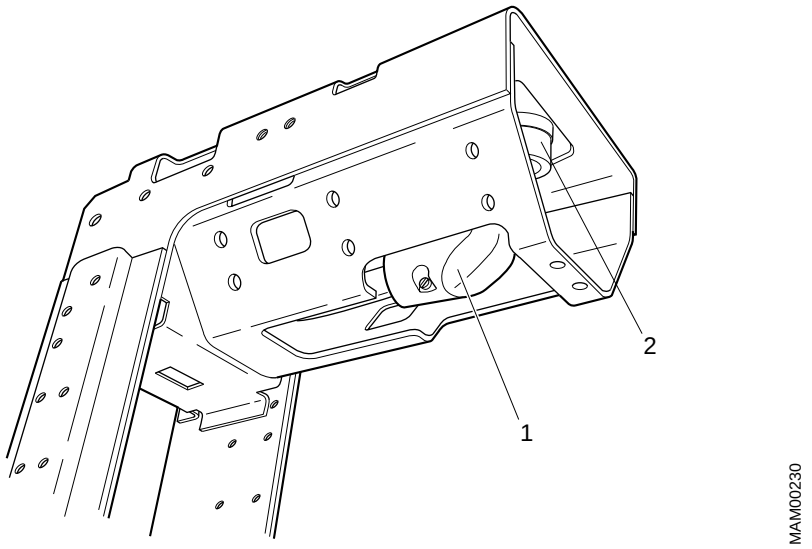

Figure 3 Location of high voltage cable

CAUTION!

The lifting carriage is well balanced. If the X-ray tube is removed and the carriage is not locked, the carriage will move upwards.

3 Remove the four fixing screws of the X-ray tube. Lift the X-ray tube to access the sleeve nut (2) of the high-voltage connector. Disconnect the high-voltage cable (1) by unscrewing the sleeve nut (2). (The high-voltage connector may not look exactly as shown in *Figure 3*.)

4 Mark the position of each cable, where it is strapped to the stand and also the strapping point.

5 Remove the angular cable-sleeve halves from the high-voltage connector. Also remove the three metal rings inside the connector. (This step is not applicable for high-voltage cables without the angular cable-sleeve.)

6 Cut cable ties which hold the cables to be released.

7 Release all disconnected cables from the swivel arm.

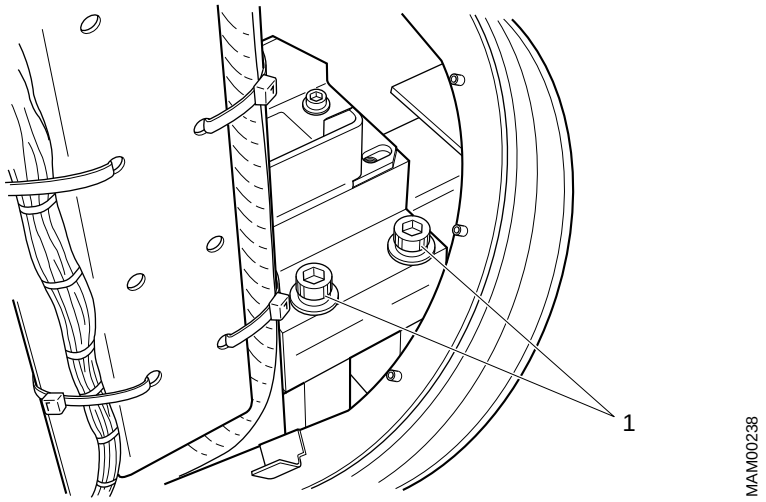

Figure 4 Object table mounting screws

8 Lower the object table 10 mm by screwing the four mounting screws (1).

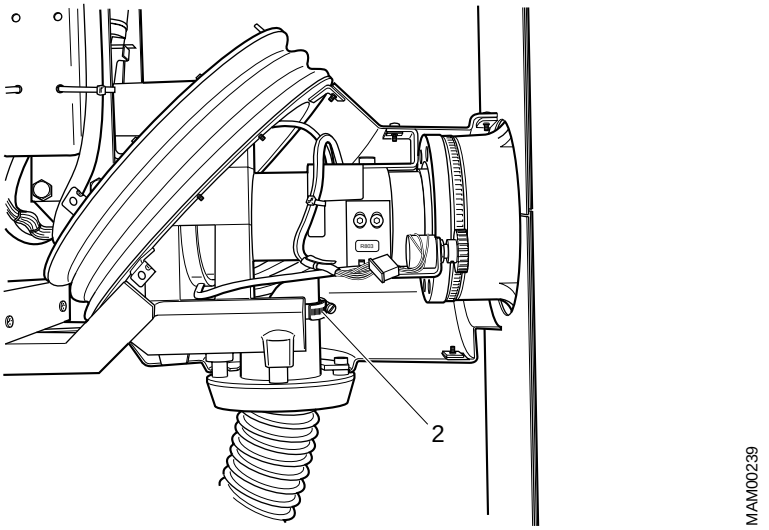

Figure 5 Hose clamp

9 Loosen the hose clamp (2).

Only for Mammomat 300 with serial No. from 04000 and upwards:

10 Unfold the shielding and remove the semcircular cabel clamp.

11 Secure the shielding to the cables with insulating tape.

Further removals

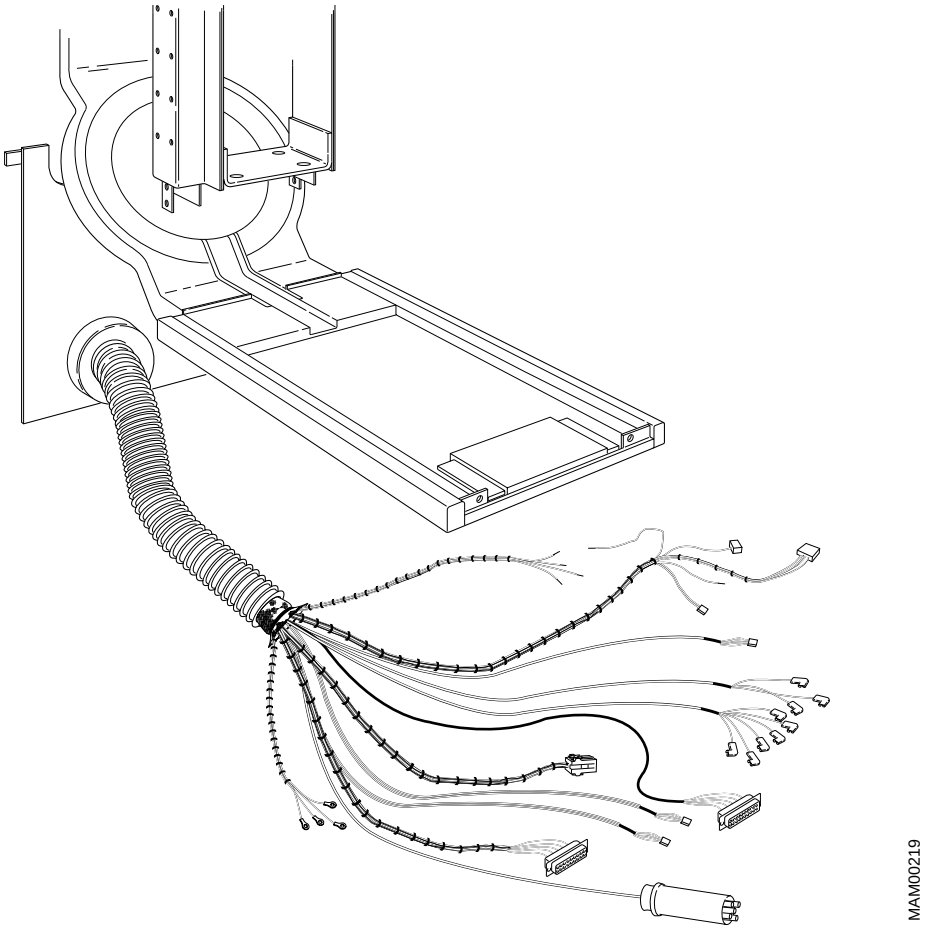

Figure 6 Splined cable-hose completely released from swivel arm system

12 Pull cable-hose with belonging cable harness out of the lead-through ring (see *Figure 6*). It might be necsessary to loosen the object table completely.

NOTE!

Register the connector location of every cable within X860. It is extremely important that they are properly reinstalled.

13 Extract the X860-pins from their connector.

14 Wind the harness with insulating tape, for an easy removal of the hose. Attach a wire at the end of the harness. The harness can be pulled through the hose with this wire.

CAUTION!

The labels on the cables and the connectors are not allowed to get in contact with the sticky side of the insulating tape. Otherwise the labels could be damaged or even removed when the insulating tape is removed.

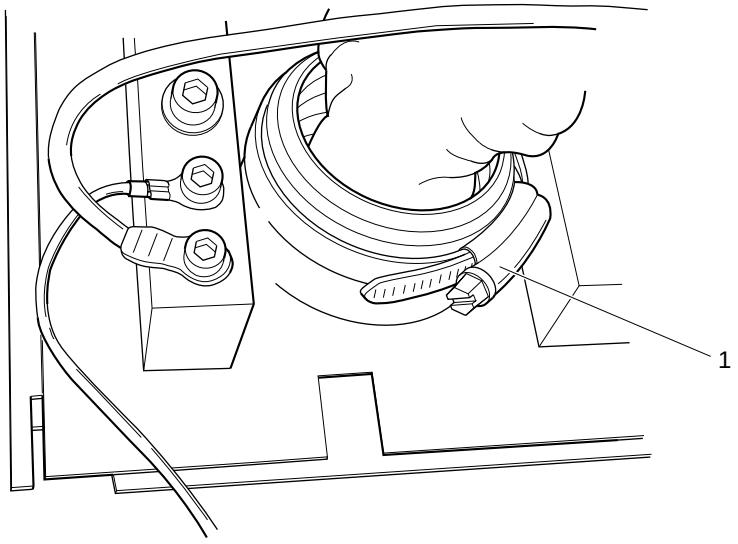

Figure 7 Hose clamp on the back

15 Loosen hose clamp (1) on the back of the lifting carriage.

16 Remove cable-hose from cable harness. Then mount a new hose.

17 Secure hose on the back of the lifting carriage with the hose clamp.

Only for Mammomat 300 with serial No. from 04000 and upwards:

- Make sure that the shielding is folded over the lead-through ring and that the semi-circular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.

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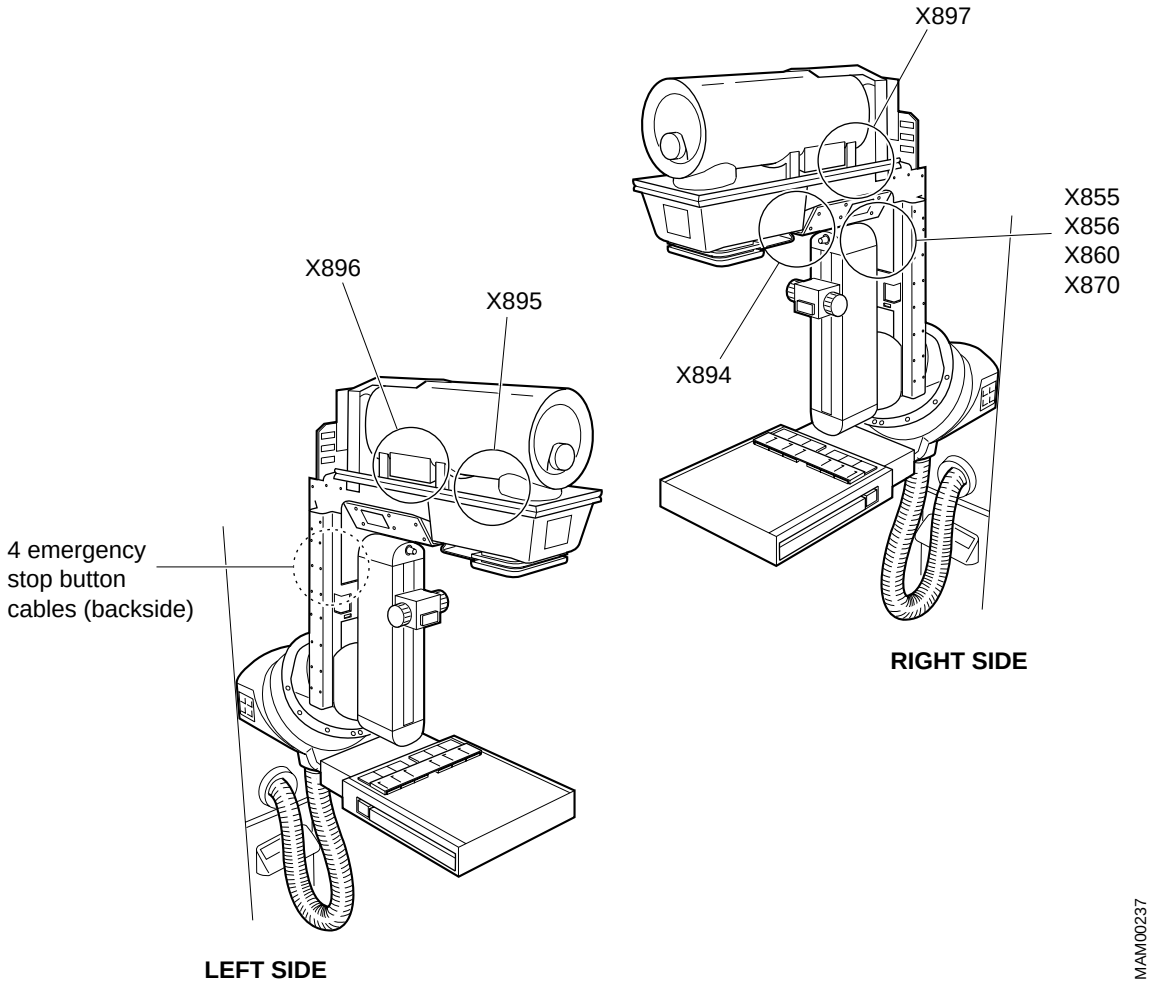

Figure 1 Connectors to be reconnected.

1 Place lead-through ring and the hose clamp on the new hose.

2 Pull new cable-hose with belonging cable harness through lead-through ring and the hollow shaft. It might be necessary to loosen the table to get the high voltage cable through.

3 Make sure that the cables (connectors) reach their original positions when they are pulled as intended.

4 Fasten the object table in its original position by fastening the four mounting screws.

5 Split main harness into two subharnesses (see *Figure 3*).

One subharness consists of cables to be pulled on the left side of the swivel-arm stand. The other consists of cables to be pulled on the right side of the swivel-arm stand.

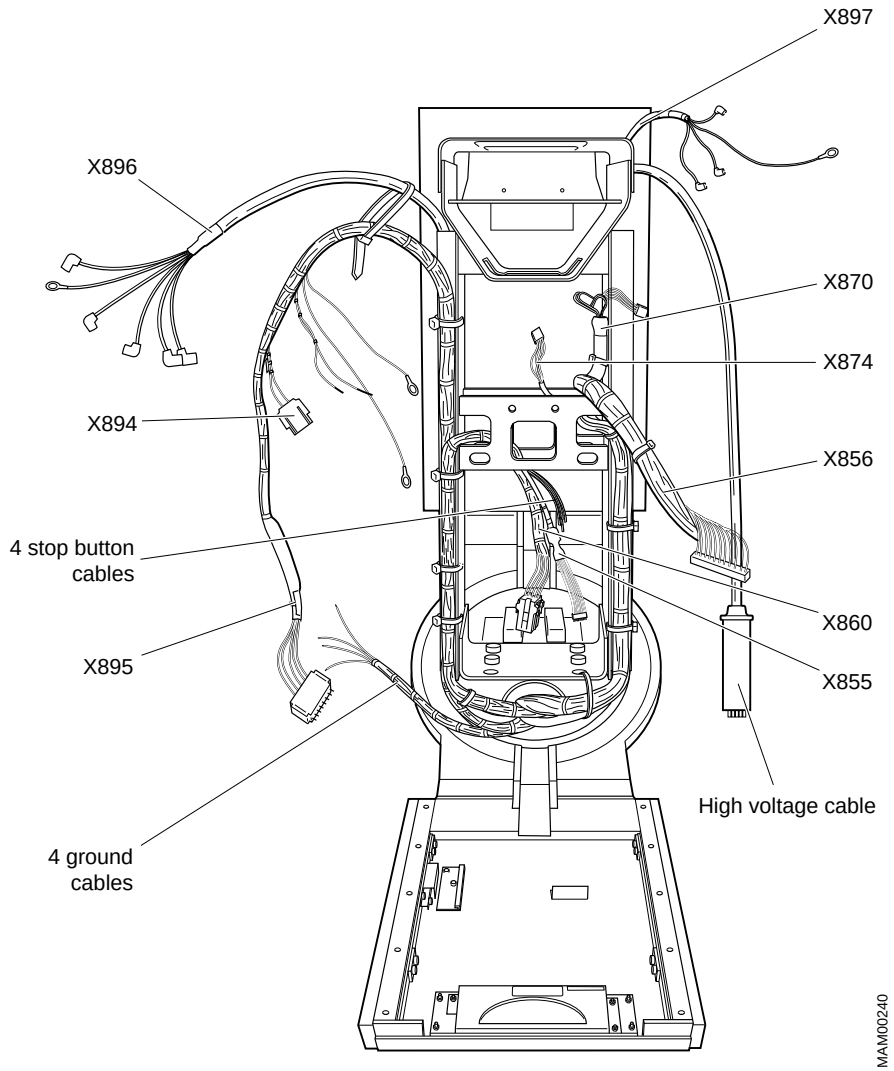

Figure 2 Subharnesses left and right

6 Adjust hose to centre the main harness in hose.

7 Secure hose clamp.

Only for Mammomat 300 with serial No. from 04000 and upwards:

- Make sure that the shielding is folded over the lead-through ring and that the semi-circular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.

8 Pull all cables as intended (according to *Figure 2* and *Figure 3*) and reconnect all connectors that will be impossible or difficult to reconnect when the fan and compression units are mounted. When reconnecting the high voltage cable; apply some silicon oil on the contact surface of the connector. Reconnect emergency stop button cables according to *Figure 4* and the list below.

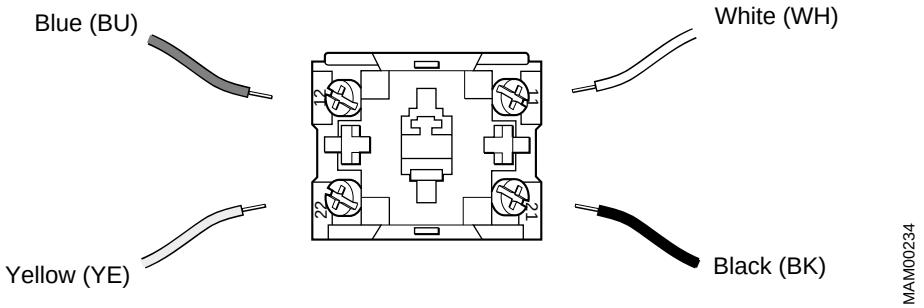

Figure 3 Reconnection of emergency stop button cables

Emergency stop button cable	Connection No.
White	11
Blue	12
Black	21
Yellow	22

9 Secure reconnected cables with cable ties.

10 Mount fan unit.

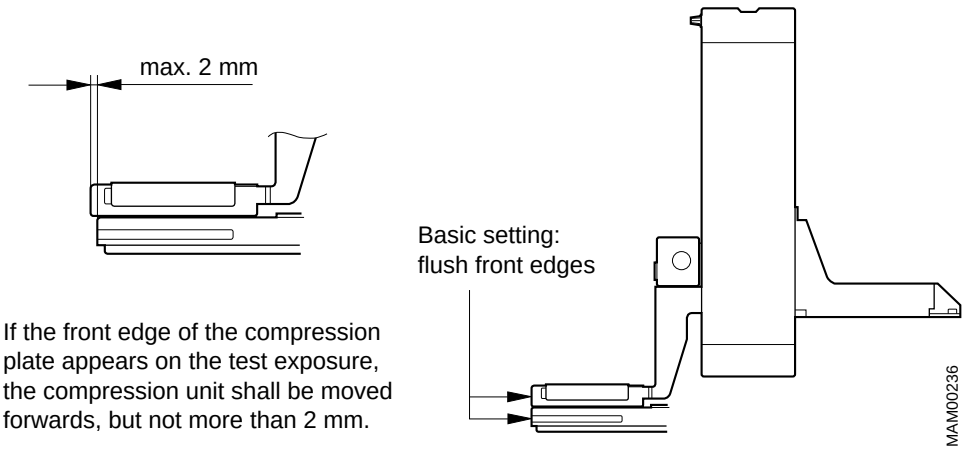
max. 2 mm
If the front edge of the compression plate appears on the test exposure, the compression unit shall be moved forwards, but not more than 2 mm.
Basic setting:
flush front edges
MAM00236

Figure 4 Correct position of compression unit

11 Fasten compression unit by securing the three mounting screws while observing the correct position as marked during disassembly.

12 Reconnect the X872, X873a and X874.

CAUTION!

Make sure that X874 does not interfere with the mounting bracket for the forkshaped sensor.

13 Connect ground cables.

14 System ON.

15 Test all unit movements (compression and tube head rotation).

16 Perform a test exposure and check the radiation field.
If the front edge of the compression plate appears on the exposure, correct the position according to *Figure 4*.

17 System Off

18 Mount all covers.

19 Perform protective earth measurement.